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REPORT TO U.S. ENVIRONMENTAL PROTECTION AGENCY  
OFFICE OF WASTE PROGRAMS ENFORCEMENT

REMEDIAL INVESTIGATION WORKPLAN  
Second Draft

MONTROSE FACILITY SITE  
(TORRANCE, CALIFORNIA)

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# SECTION 1

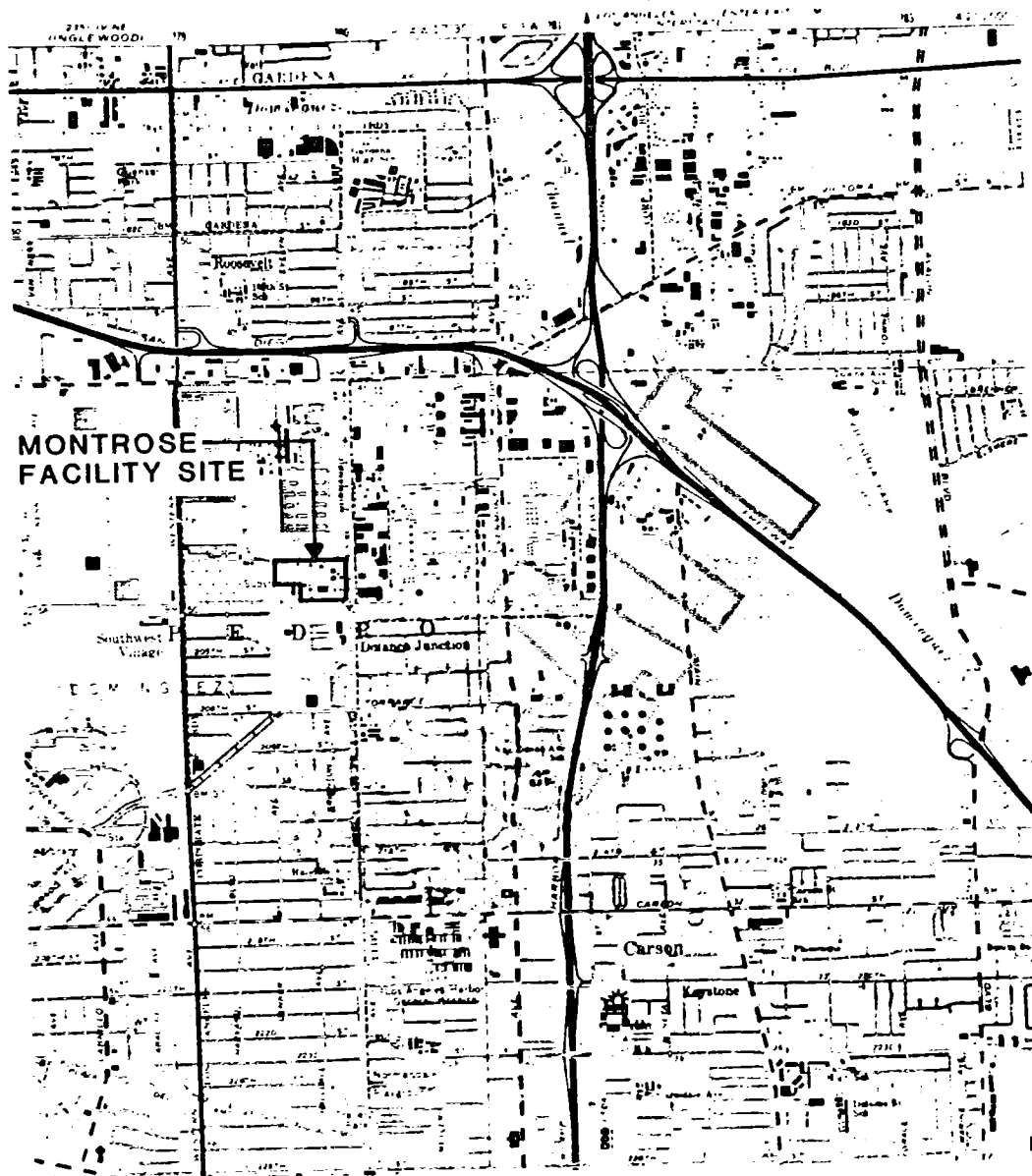
## INTRODUCTION

Section 1  
INTRODUCTION

BACKGROUND

The Montrose Facility Site covers roughly 13 acres on Normandie Avenue in Torrance, California (Figure 1). From 1947 to 1982, DDT was manufactured and/or processed at this site. Due to its persistence and toxic effects on wildlife, DDT use was banned in the United States in 1972, and it is now listed as an EPA Priority Pollutant. An EPA investigation in 1982 found DDT in surface water runoff and sediments leaving the Montrose property. This resulted in issuance of simultaneous enforcement orders by EPA and the California Regional Water Quality Control Board requiring (1) prevention of DDT discharge from the property, (2) sampling soils and surface water, and (3) design and implementation of remedial action.

In response to these orders, Montrose sampled soils for DDT and proposed paving the property and converting it to a warehouse facility. EPA and its contractor reviewed the proposed remedial action, held a public meeting, and accepted comments from the public and state and local agencies. The following work plan has been developed to address concerns expressed at the public meeting and during the comment period, and to ensure that the remedial action implemented has been selected in accordance with federal policy as outlined in the National Contingency Plan (NCP).



SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP:  
TORRANCE, CALIFORNIA, 1972

FIGURE 1. VICINITY MAP - MONTROSE FACILITY SITE  
TORRANCE, CALIFORNIA

## WORK PLAN SUMMARY

The general Remedial Investigation (RI) concept presented in this draft Work Plan is based on a two-part field investigation. In the first part, soil and groundwater samples on the site would be analyzed for all EPA Priority Pollutants. From these results, a List of Target Chemicals would be identified and subsequent field investigations would be limited to those compounds known to be of concern on the Montrose facility site. The objective of the subsequent investigations would be to define extent and location of contamination both onsite and offsite in sufficient detail to perform the Feasibility Study, which consists of environmental and public health assessments and selection of the most cost-effective remedial alternative(s). Soil, air, groundwater, surface water, and sediments in storm drains and sanitary sewers will be sampled and evaluated. The offsite drainage path between the Montrose Facility and Farmer Brothers Coffee is presently accessible to passersby and employees and should be fenced immediately to protect the public from the hazard of direct contact with contaminated soils.

## SCHEDULE

The complete Remedial Investigation and Feasibility Study is expected to take about 14 months, as shown in Figures 2 and 3. The RI consists of 18 tasks, which can be grouped into three major elements, each concluding with a major written product subject to EPA review and approval. The first element (Tasks 1-9) lasts 2-1/2 months and involves preparation for the field investigations including preparation of detailed plans for Health and Safety, Quality Assurance, Sampling, and Community Relations. The second element (Tasks 10-13) lasts 2 months and consists of the Part 1 onsite field investigations and development of the List of Target Chemicals. The final RI element (Tasks 14-17) will take 4 months and includes Part 2 onsite and all offsite field investigations and preparation of a complete Remedial Investigation Report.

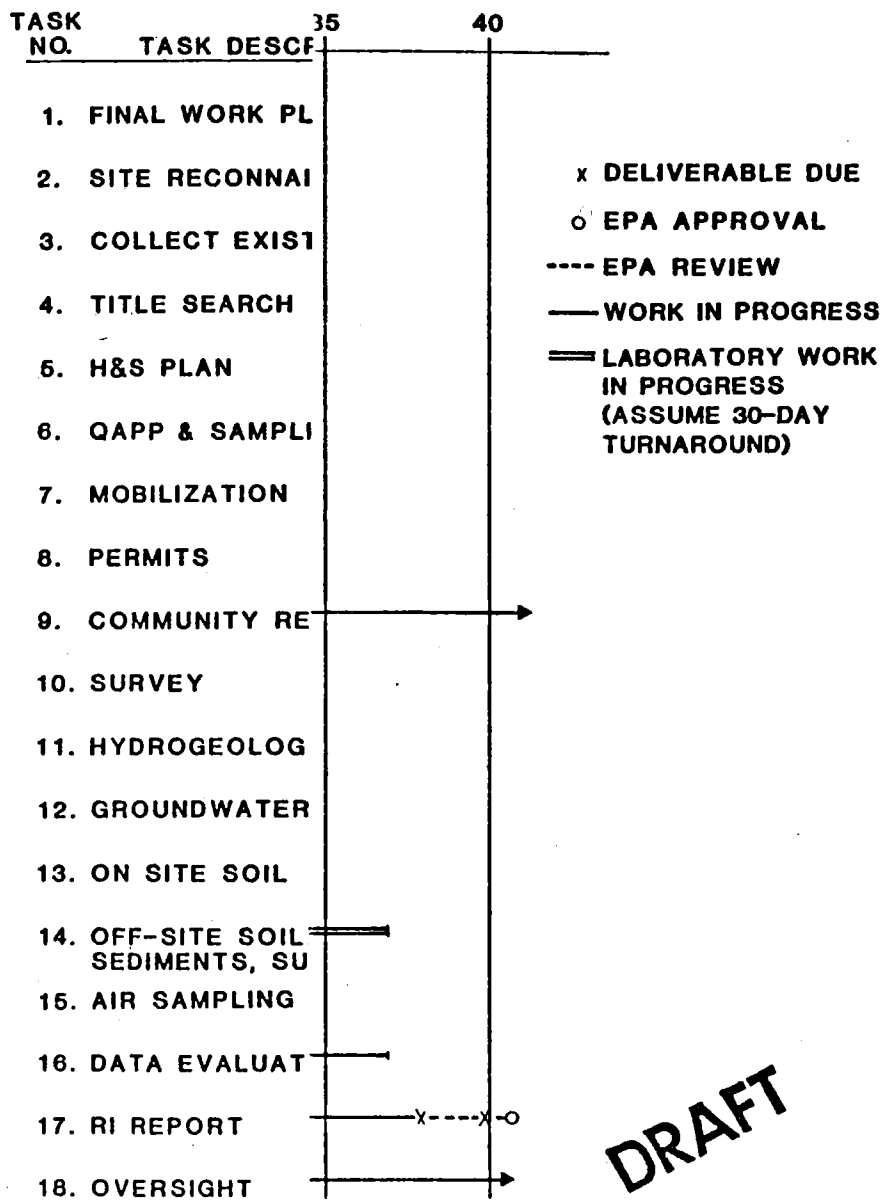
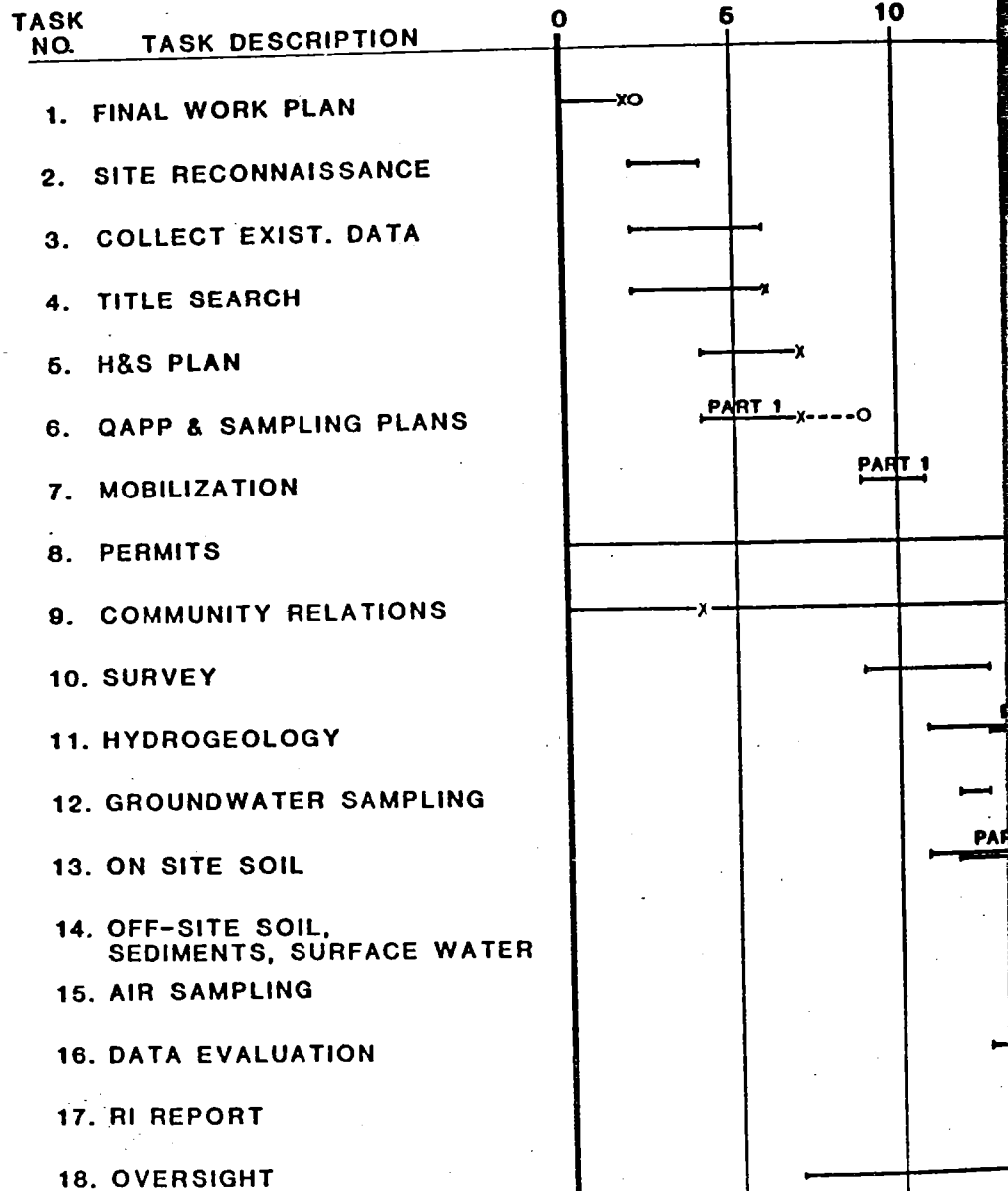


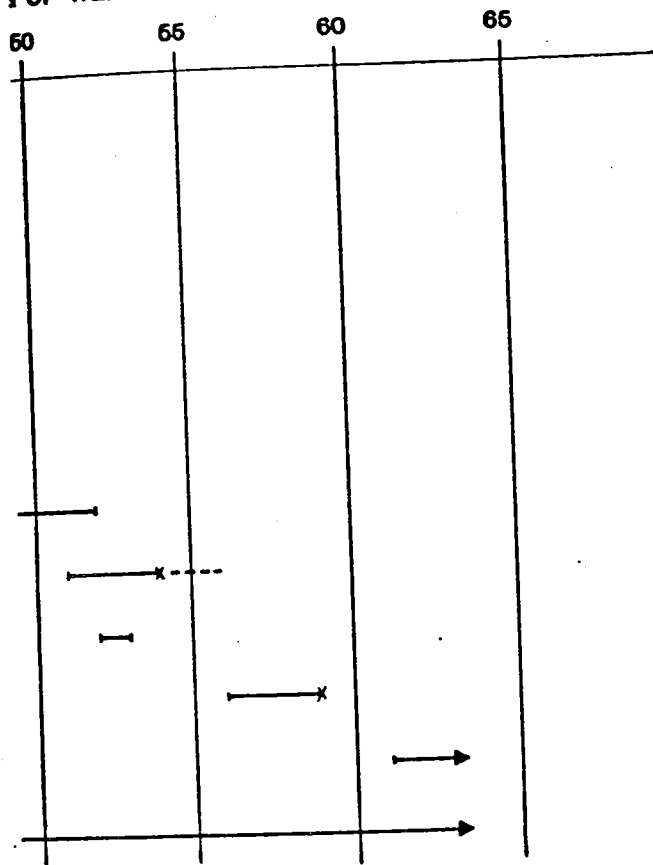
FIGURE 2. REMEDIAL INVESTIGATION SCHEDULE  
MONTROSE FACILITY SITE





TASK NO.	TASK DESCRIPTION	35	40	45	BEGINNING
19	FINAL WORK PLAN		10		
20	OBJECTIVES		1		
21	IDENTIFY ALTERNATIVES		1		
22	ENDANGERMENT ASSESSMENT		1		
23	INITIAL SCREENING		1		
24	TREATABILITY WORK PLAN			1	
25	EVALUATE ALTERNATIVES			1	
26	PRELIMINARY FS REPORT				
27	POSTCLOSURE				
28	FINAL FS REPORT				
29	CONCEPTUAL DESIGN				
30	COMMUNITY RELATIONS				

3 OF WEEK



- x DELIVERABLE DUE
- o EPA APPROVAL
- EPA REVIEW
- WORK IN PROGRESS
- LABORATORY WORK IN PROGRESS (ASSUME 30-DAY TURNAROUND)

**DRAFT**

FIGURE 3.  
FEASIBILITY STUDY SCHEDULE  
MONTROSE FACILITY SITE

While the RI Report is being finalized, the conceptual Feasibility Study Work Plan in Section 3 of this document will be revised and finalized. The final Feasibility Study Report is due about 4 months after the Remedial Investigation Report has been finalized. During the feasibility study, all feasible remedial alternatives will be evaluated in detail and one will be selected after careful consideration of public health, environmental, and other effects. Public comments will be accepted on the Feasibility Study before the final decision on remedial action is made.

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SECTION 2  
REMEDIAL INVESTIGATION  
WORK PLAN

Section 2  
PHASE I - REMEDIAL INVESTIGATION WORK PLAN

The following consists of the detailed work plan outline for the Remedial Investigation (RI) to be conducted at the Montrose Facility Site. Not provided in this detailed work plan are the site-specific Health and Safety Plan and the Quality Assurance Project Plan and Sampling Plans which would be provided in or incorporated into the final work plan submitted by the contractor(s) who will oversee/perform the RI. Detailed costs and schedule would be developed in the final Work Plan.

The remedial investigation tasks described below have been divided into Preliminary Activities and Site Activities.

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## REMEDIAL INVESTIGATION - PRELIMINARY ACTIVITIES

A total of nine tasks comprise the Preliminary Remedial Investigation Activities. These activities are required before the Site Activity tasks in the remedial investigation can be initiated.

### Task 1 - Preparation of Final Remedial Investigation Work Plan (10 days)

After an EPA review of this work plan, a final work plan would be prepared by the contractor(s) to further define the project organization, task assignments, personnel and resource requirements, project schedule, budget costs, procurement, milestones for EPA review, and training requirements.

### Task 2 - Performance of Site Reconnaissance (10 days)

The investigation team would conduct a brief on-site and off-site reconnaissance in order to:

1. Assess potential on-site and off-site health and safety hazards for the subsequent RI. The investigation team will locate physical hazards and features on a preliminary field plan drawing and document the features photographically. Special attention would be paid to identifying drainage systems, including exposed piping and catchbasins, and determining if they are active. All features would be oriented to a field plan grid system.
2. Verify and observe signs of contamination and document waste characteristics for both on-site and offsite areas. The site and downgradient surface water discharge areas (swale, storm drains, channels, sewer

manholes) would be inspected visually for contamination and presence of sediment. Obvious waste characteristics would be documented.

3. Select and verify appropriate locations for subsequent off-site surface water and sediment sampling.
4. Observe areas of on-site soil/debris/crushed concrete piles and select appropriate locations for subsequent sampling.
5. Perform air characterization for volatiles on-site and in off-site storm drainage/sewer manholes in order to
  - (a) develop baseline air quality data and/or
  - (b) determine the level of respiratory protection needed during subsequent remedial investigations.

Some of this information may be obtainable from records available at this time. However, verification of the data, updating site conditions, and retrieval of additional information would be required.

A Health and Safety Plan will be developed specifically addressing site reconnaissance activities prior to site entry or offsite manhole sampling.

Task 3 - Collection and Evaluation of Additional Existing Data  
(15-20 days)

It would be necessary to collect and evaluate additional information which was not available for the preparation of this work plan. This information will help fill data gaps. In addition to EPA files, the following sources of information will be consulted:

- Montrose Chemical Co. for the following sampling results required by EPA Enforcement Order No. 83-01 dated May 6, 1983:

Section I.B. On-site and off-site stormwater sampling from each storm event.

Section II.A. Sampling necessary to support remedial actions to abate MCB contamination of water and soil both on-site and off-site.

In addition, chemical analyses of sealants used on-site on the stormwater retention berm, property outside the berm, and soil/crushed concrete/debris piles should be requested.

- McDonnell-Douglas Co., Jones Chemical Co., the Aluminum Company of America (or present property owner), Martin Marietta, Farmer Brothers Coffee Co., and owners of any other property located adjacent to the Montrose Facility Site, for information on groundwater wells located on their properties.
- Regional Water Quality Control Board for DDT and MCB monitoring results and background information developed for their enforcement order.
- South Coast Air Quality Management District, El Monte, California, for information on wind speed and direction and other air monitoring data for the vicinity of the Montrose Facility Site. Archived samples may be available for analysis.
- California Department of Health Services (DOHS) for any air and/or groundwater information which may be contained in their files on the Del Amo (Cadillac-Fairview) hazardous waste site which is located in close proximity to the Montrose Facility Site.

- California Department of Water Resources for information on local groundwater.
- Los Angeles County Flood Control District for information, groundwater design drawings and hydrologic information, and priority.
- Los Angeles County Sanitation Districts for information on sedimentation in sewers and in DDT monitoring results.
- Los Angeles County Health Department for information.
- Montrose Chemical Co. for information on occupational health, air monitoring for DDT or source emissions testing.
- National Weather Service, Los Angeles, CA for monthly wind rose or other wind frequency data.
- Local tax office, deed office to determine prior site ownership/land use.
- Local aerial flying service, appropriate state offices, EPA-EPIC aerial photo branch for a review of historical air photos of the site.
- Local/area chamber of commerce, business directories, agriculture services, etc. to determine any other area manufacturers or large-scale users of DDT.
- Chemical manufacturing associations, Montrose Chemical Co. and other reference sources to review DDT manufacturing process and determine products/chemicals.

used in the manufacturing operation and any byproducts and/or waste products generated.

Data obtained from these and other sources will be used to assist in the site investigation.

Task 4 - Title Search (20 days)

A title search will be conducted to develop the history of ownership of the Montrose site. Title documents will be collected, land descriptions reviewed, and a sequential listing of owners of each parcel within the current Montrose site boundaries will be prepared. This task includes production of the final History of Ownership report, which will be submitted to EPA.

Task 5 - Development of Site Health and Safety Plan (10-15 days)

A site Health and Safety Plan (H&S Plan) would be developed for future investigative and remedial work at the Montrose Facility site. It will reflect all known data on the site, including air characterization performed under Task 2. The H&S Plan will also contain task-specific safety elements because of the varied tasks needed to complete the RI work on- and off-site.

The purpose of the Health and Safety Plan will be to:

- Delineate personal protection requirements and procedures and responsibilities for on-site/off-site personnel and any subcontractors.
- Delineate training and equipment requirements necessary for the performance of expected tasks and ensure that training is completed and equipment is available.

- Delineate ongoing air monitoring requirements necessary during sampling activities to revise specific protection levels as required.
- Protect the general public and the environment.

The H&S Plan will be reviewed by EPA before commencement of on- or off-site sampling activities.

Task 6 - Development of Quality Assurance Project Plan and Sampling Plans (15-20 days)

A Quality Assurance Project Plan (QAPP) would be developed for the Montrose Facility site work to ensure that all data generated are scientifically valid, defensible, comparable, and of known precision and accuracy. The QAPP developed by contractors will require approval by EPA prior to initiating site work. It will address standards and/or criteria for the following site-related operations: selection of monitoring well drilling methods and materials; topographic surveying; aerial photography and ground control points; calibration and operation of field equipment.

The minimum elements of the QAPP will be:

- Field sampling procedures
- Methods for preventing sample cross-contamination
- Field bias blanks, splits, and duplicates
- Use of field data sheets to document dates, start and stop times, locations, meteorological conditions, problems experienced and corrective actions taken, and calibration of field instruments.

- Other in-field documentation requirements, including photography
- Preservation, packing, shipping, and handling procedures
- Sample tags and chain-of-custody sheets for all samples
- Analytical methods
- Sample calculations for all data reduction
- Calibration procedures
- QC checks on reagents
- Internal and external audits

Sampling plans for each type of field investigation will be developed covering:

- Intended end use of data
- Selection of analytical parameters and other field measurements, including justification
- Expected variance in measurements
- Selection of sampling locations and frequency, with justification
- Revisions of modifications to field methods specified in QAPP, as necessary

Since the field investigations are phased, with scope of the second part dependent on results of the first part, Sampling Plans will be prepared at several times during the RI. Sampling

Plans for the Part 1 Onsite Soil and Part 1 Hydrogeology and Groundwater Sampling (Tasks 11-13) will be submitted with the QAPP. Sampling Plans for the Part 2 Onsite Soil; the Offsite Soil, Sediment, and Surface Water; and the Air Sampling (Tasks 13-15) will be prepared after EPA acceptance of the Part 1 results. EPA approval of all Sampling Plans is required prior to sampling activity.

Task 7 - Mobilization of Field Equipment (Part 1: 10 days, Part 2: 5 days)

The equipment needed during the remedial investigation would be mobilized by the contractor or subcontractors. The following equipment may be needed at the Montrose Facility Site during the remedial investigation:

- Field office trailer
- Groundwater monitoring well installation equipment
- Air sampling equipment
- Groundwater, surface water, soil, sediment and waste sampling tools and equipment
- Health and safety equipment
- Decontamination equipment.

Task 8 - Acquisition of Permits, Right of Entry and Other Authorizations (10 days - 3 months)

All necessary permits for groundwater monitoring wells would be acquired. Tax records would be examined to verify and/or determine the ownership of any and all properties before any sample collection is performed. Existence and location of any right-of way or utility easements would also be verified and/or determined, including the Southern Pacific Railroad rights-of-way and the Los Angeles Department of Water and Power Easements. The need for Right of Entry to the Site and/or surrounding properties as well as any other necessary permits or authorization would be identified by the contractor.

Task 9 - Performance of Community Relations Support Functions  
(ongoing)

Community relations support will be provided to include the development and implementation of a Community Relations Plan (CRP) logistic support for the planning and execution of the activities for the Montrose Facility Site and technical support to ensure that all distributed information is accurate and current.

The CRP will include a brief site description and chronology of site and community relations activities; identify key community issues and concerns; define objectives and techniques of the community relations program; identify community relations milestones such as public meetings, written communications, 2-week public notification periods, and 3-week public comment periods; and include a mailing list of interested parties.

Identifiable milestones for fact sheet distribution and, in some cases, public meetings, through completion of the Feasibility Study (FS) phase would include:

1. Final RI/FS Work Plan
2. Results of Part I On-Site Soil Sampling and List of Target Chemicals
3. Results of Complete RI
4. Completion of FS
5. Enforcement Record of Decision (ROD)

REMEDIAL INVESTIGATION - SITE ACTIVITIES

The purpose of Site Remedial Investigation Activities is to gather site-specific information concerning the type and extent of contamination so that appropriate remedial responses can be identified and evaluated during the subsequent feasibility study.

A total of nine tasks comprise the Site Remedial Investigation Activities.

Task 10 - Performance of Site Mapping Including a Property Survey and Topographic Survey (20 days)

A property survey will be conducted to delineate and verify certain property lines of all properties adjacent to the site and also the Farmer Brothers Coffee Co. property. These property lines will be identified in the field and on a Site Base Map and will be used in gaining access and right of entry for any subsequent subsurface investigations and/or monitoring purposes. A topographic survey will also be conducted in preparation of the Site Base Map. The Site Base Map will be used during the remedial investigation and implementation of remedial actions and for determining the horizontal and vertical locations of existing and proposed groundwater monitoring wells. The existing site topographic Map (reproduced in the M&E report, November 1983) is no longer valid as a result of site grading conducted by Montrose Chemical Co.

Existing property records at the local courthouse and local tax assessment maps will be examined. A field survey crew will delineate and mark property lines in the field and on the Site Base Map.

Site topography will be mapped using aerial photography with ground control. The approved contractor will establish horizontal and vertical ground control as required by the aerial

photography subcontractor. Field crews will establish and construct points which will be visible on the aerial photographs. A permanent benchmark for horizontal and vertical control will be established and tied to USGS mean sea level (MSL) datum.

The site will be flown, in suitable weather and visibility, by the approved subcontractor. Specific flight parameters such as speed, number of flight lines, photographic exposure interval, and flight altitude will be controlled by the photogrammetrist to provide for a proper and completely finished topographic map covering an area including the Montrose Facility site and all areas within 500 feet of the delineated site boundaries.

The topographic site base map will be a single, scribed, double matte, 3-mil washoff mylar with reversed image. The map will have a horizontal scale of 1 inch = 100 feet and a contour interval of one foot. One off-site and four on-site temporary benchmarks should be established and located on the Site Base Map. A 200-foot square grid will be overlain on the map, labeled with reference numbers and letters to allow easy identification of portions of the property and sample locations. Each 200-foot grid square will be subdivided into four equal-area quadrants. The grid will cover the entire mapped area, not just within the site boundaries.

All utilities and abutting property owners will be contacted to determine location, size, nature, and materials of underground piping, drains, catchbasins and other structures. These will be shown in plan view on the Site Base Map and, where necessary, in cross-section. This information will be used to (1) prevent unnecessary damage during soil sampling and well installation and (2) assess technical feasibility and cost of various alternative remedial actions. It is possible that some nonintrusive geophysical techniques, such as magnetometers or ground penetrating radar, may be necessary to adequately define subsurface structures and utilities.

Following the installation of groundwater monitoring wells, all wells will be located horizontally and vertically with respect to the temporary benchmarks (datum MSL) and drawn onto the Site Base Map. These elevations and locations are necessary to determine the hydrogeologic conditions beneath the site.

Task 11 - Performance of Hydrogeologic Investigation (40 days)

The Montrose Facility Site is located on the coastal plain in a groundwater basin known as the west plain (Poland, Garrett, and Sinnott, 1959) or the west coast basin (State of California Department of Water Resources, 1961). The basin consists of a series of aquifers which are listed below as they reportedly occur in the vicinity of the site:

Formation names	Aquifer names	Approximate aquifer elevation (datum MSL)
Lakewood Formation (Terrace Cover, Palos Verdes Sand, unnamed Upper Pleistocene deposits)	"Semi-perched" aquifer Gage aquifer (200-ft sand)	-30 to ? -80 to -130
San Pedro Formation	Lynwood aquifer (400-ft gravel) Silverado aquifer	-200 to -325 -450 to -650

Recent water level data for the "semi-perched" aquifer in the vicinity of the site are not available, but the log for the Jones Chemical Co. well (LACFCD No. 795), which is within several hundred feet of the Montrose site, indicates that water was "struck" at 71 feet. Dry sand was logged from 53 to 71 feet, underlain by yellow clay from 71 to 102. This well is perforated in the Silverado aquifer.

Two wells that are perforated in the Gage aquifer (LACFCD Nos. 785c and 806C) are located about one mile southwest and south of the site, respectively. The water level elevations in those wells in 1978 were -31 feet and -38 feet. All of these waters level data suggest that the water table in the "semi-perched" aquifer at the site occurs at a depth of about 70 feet. The exact depth of the borings and the wells will be determined in the field during the investigation.

The hydrogeological investigation may be composed of two or more parts. The objective of Part 1 is to determine if contaminants from the Montrose site are moving down through the unsaturated zone to the groundwater system. A summary of the sampling requirements of Part 1 is shown in Table 1. When Part 1 of this task and Task 12 (Groundwater Sampling) have been completed, a preliminary Hydrogeologic Report will be prepared for EPA review. If EPA determines that chemicals originating at the Montrose Facility site are migrating to groundwater, a Sampling Plan for a Part 2 Hydrogeologic Investigation will be developed, with the objectives of defining vertical and horizontal extent of contamination; identifying potential pathways for migration and receptors; and developing sufficient data to assess public health and environmental risks, evaluate technical feasibility, and estimate costs of alternative remedial actions.

Table 1. HYDROGEOLOGIC INVESTIGATION - SAMPLING REQUIREMENTS  
Five Wells, Screened in "Semi-Perched Aquifer"

<u>Sample collection</u>				
<u>Sample type</u>	<u>Sampling technique</u>	<u>Sampling interval</u>	<u>Depth, ft</u>	<u>Field analysis</u>
Soil	Split-spoon or Shelby tube	Continuous	0-30	OVA
Soil	Split spoon or Shelby tube	5 ft	30 to bottom of boring	OVA
<u>Laboratory analyses of selected soil samples</u>				
<u>Selection criteria</u>		<u>Analyses</u>		
All samples with OVA above background		EPA Priority Pollutant		
One sample of each saturated stratum per boring		EPA Priority Pollutant		
<u>Water level measurement</u>				
- Four weekly water level measurements in all five wells - Preliminary Report				
- Monthly measurements in all wells until ROD complete				

Hydrogeologic Investigation-Part 1. To determine if chemicals have migrated from the Montrose site to the groundwater system, soil and groundwater in the "semi-perched" aquifer and any perched water bodies that may exist above it will be evaluated. The drilling program and the subsequent construction of monitoring wells will be done (1) to provide hydrogeologic data regarding the movement of water in the unsaturated and saturated zones and 2) to provide soil and groundwater samples for chemical analysis. Five on-site borings, all of which will be converted to wells, will be drilled to an estimated depth of 70 to 100 feet, as shown in Figure 4.



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penetrating the upper soils, is  
ing this potential problem.

es will be taken continuously from  
h of 30 feet, and at five-foot intervals  
ings will be logged by a qualified  
observations to be recorded including  
color, moisture content, presence  
recovery, and any problems encountered  
ing.

recovery, and any p  
ing.  
be collected, handle  
g to criteria specif  
the QAPP and Samplin  
organic vapor analy

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Screens and riser pipes will be installed in the completed boreholes, and the annular space around the well screens will be backfilled with clean, coarse sand to 2 feet above the top of the well screen. A layer of bentonite pellets 5 feet thick will be placed above the sand pack. The annulus between the well and the borehole wall above the bentonite seal will be filled with cement and bentonite grout. The grout will be placed with a tremie pipe just above the top of the bentonite layer. The grout will be pumped through this pipe to the bottom of the annulus until undiluted grout flows from the hole at the ground surface. A protective, lockable steel casing will be placed over each monitoring well and grouted in place.

The monitoring wells will be developed to remove the fine-grained aquifer materials from the vicinity of the well screen so that clear water samples can be collected. Proper development will probably be difficult in the case of the semi-perched aquifer beneath the Montrose site for the following reasons: the aquifer apparently contains a significant percentage of fine-grained materials, the well yields will probably be low, and the water table is too deep for suction pumping. To attain the best possible development, wells will be screened in the coarsest materials available. Consideration will be given to using filter fabrics around the wells screens or using piezometer-type, air-drive samplers with adjacent small-diameter wells.

After well development has been completed, a series of four weekly water level measurements will be taken; these will be included in the Part 1 Hydrogeologic Investigation Report described below. Thereafter, monthly water level measurements will be taken and results submitted to EPA until the ROD has been completed. Water level elevations referenced to mean sea level will be calculated based on survey data developed in Task 10. Groundwater flow direction will be evaluated.

10 26 01

Within 30 days after completion of Part 1 of Tasks 11 and 12, a preliminary report of the hydrogeologic investigation will be submitted to EPA. The report will contain boring logs of the 5 on-site wells, details of well construction and development, water level elevations, the results of chemical analyses of groundwater (Task 12) and soil, and a summary of hydrologic information obtained in Task 3. These results will be reviewed in conjunction with results of Part 1 of the On-Site Soil Sampling (Task 13), and a determination made as to whether chemicals migrating from the Montrose Facility Site have reached the groundwater system. If this is the case, additional information will be needed to evaluate the necessity for remedial action, and a Sampling Plan for Hydrogeologic Investigation-Part 2 will be prepared in accordance with the objectives below.

(If Necessary) Hydrogeologic Investigation - Part 2. If contaminants from the Montrose site are identified deep in the unsaturated zone or in the uppermost aquifer, then additional investigation(s) will be carried out to determine the flow path of the contaminants and the potential receptors. The objectives of these investigations would be to determine the vertical and lateral extent of contamination and to define the regional flow system. The required tasks would include an inventory of existing wells within a three-mile radius of the site and sampling of existing and newly-installed wells off-site in the "semi-perched" and the Gage aquifers. Chemical analyses would be performed only for target chemicals (determined in Task 13) and other constituents necessary to evaluate the groundwater flow pathways and receptors.

Task 12 - Sampling Monitoring Wells (5 days)

Groundwater monitoring wells (constructed under Task 11) will be sampled once with a bladder type, gas-driven sampling device. Prior to collecting the sample, three static well casing volumes of water will be pumped from each well. The purged water will be collected in drums, analyzed to determine appropriate disposal methods, and disposed of in accordance with state and local regulations. Sample collection, handling, preservation, labeling, and chain-of-custody procedures established in the QAPP and Sampling Plans will be followed. Groundwater samples will be collected during Part 1 from the five on-site wells and all other wells identified in Task 3 within a 1-mile radius of the site, as shown in Table 2. Prior to sampling each off-site well, the elevation of the perforated zone will be determined and included in the preliminary report.

Table 2. TASK 12 - MINIMUM GROUNDWATER SAMPLING AND ANALYSES REQUIREMENTS

Sample type	Location	Aquifer	No. samples	Analyses
Groundwater	Onsite	"Semi-perched"	5	Complete Priority Pollutant
Groundwater	Offsite	All	Min. 3 <sup>a</sup>	Complete Priority Pollutant

a. All wells identified in Task 3 within a 1-mile radius will be sampled.

Task 13 - On-site Soil and Waste Pile Sampling (Part 1: 30 days, Part 2: 30 days)

Soil sampling on-site performed by Montrose in 1983 has shown DDT concentrations up to 95,000 ppm (9.5 percent). Total DDT has been identified in concentrations exceeding the California Total Threshold Limiting Concentration (1 mg/kg) at depths greater than 5 feet. In the western portion of the site, where the highest DDT levels were found, foreign materials were noted in the boring logs: yellow and white streaks, black granules, and gels or greases. Since the 1983 on-site sampling was performed,

extensive earthwork has been done on-site, so the existing sampling data is no longer a valid indication of the location and extent of contaminated soils.

Chemicals other than DDT have reportedly been used and/or manufactured at the site, e.g., monochlorobenzene, sulfonic acid, chloral and others. DDT-contaminated materials have been sprayed for dust control by a hydrocarbon or asphaltic preparation. Data is needed to determine the existence and extent of other chemical contamination, which also may impact the migration of DDT by causing desorption or solubilization.

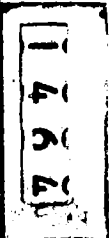
A two-part soil sampling program will be conducted, as summarized in Table 3. The objective of Part 1 is to identify chemical contaminants and to determine the maximum depth of soil contamination of the site. Results of this program will be evaluated jointly by EPA and the sampling contractor to target specific chemicals for more detailed analysis. The List of Target Chemicals, as approved by EPA, will form the basis for all further sampling (soil, water, air). The objective of the second part is to define the areal and vertical extent of the targeted compounds and other chemical parameters necessary to perform the Feasibility Study (technical evaluation, assess public health and environmental risks, and estimate costs of alternative remedial actions).

Prior to initiating soil sampling, Sampling Plans will be prepared by the contractor, and reviewed and approved by EPA. The following considerations should be included in the On-Site Soil Sampling Plan. Figure 5 shows the grid to be used to identify sample locations for both parts of the on-site soil sampling program. The site has been divided into grid squares measuring 200 feet on a side, with each grid square divided into four equal-area quadrants. The grid numbering system established in Task 10 will be used throughout the RI to designate sample locations.

Table 3. TASK 12 - ON-SITE SOIL SAMPLING REQUIREMENTS

Sample type	Depth	Total No.	Analyses
<u>Part 1</u>			
In situ - Soil	0-1 in.	18	All Priority Pollutant
Soil	2 ft	18	All Priority Pollutant
Soil	4 ft	18	All Priority Pollutant
Soil	6 ft	18	All Priority Pollutant
Soil	8 ft	18	All Priority Pollutant
Soil	10 ft	18	All Priority Pollutant
Piles - Crushed concrete	0-1 in.	min 2 <sup>a</sup>	All Priority Pollutant
Crushed concrete	3 ft	min 2 <sup>a</sup>	All Priority Pollutant
Crushed concrete	5 ft	min 2 <sup>a</sup>	All Priority Pollutant
Crushed concrete	0-1 in.	1	Grain size plus
Crushed concrete	3 ft	1	Priority
Crushed concrete	5 ft	1	Pollutant
Soil/debris	0-1 in.	3 <sup>a</sup>	All Priority Pollutant
Soil/debris	3 ft	3 <sup>a</sup>	All Priority Pollutant
Soil/debris	5 ft	3 <sup>a</sup>	All Priority Pollutant
<u>Part 2</u>			
In situ - Soil	0-1 in.	48	Target compounds
Soil	1 ft <sup>b</sup>	max 48	Target compounds
Soil	2 ft <sup>b</sup>	max 48	Target compounds
Soil	3 ft <sup>b</sup>	max 48	Target compounds
Soil	4 ft <sup>b</sup>	max 48	Target compounds
Soil	5 ft <sup>b</sup>	max 48	Target compounds

- Minimum of: nine samples per pile or one sample per 200 cubic yards above grade, whichever is larger.
- Part 2 samples will be at 1-ft intervals. Maximum depth will be determined by EPA based on Part 1 results; maximum depth may vary from grid square to grid square.
- Separate Priority Pollutant analysis on each size fraction.



W E C A L E B B E D O N

At each designated sample location, continuous soil samples will be taken and logged by a qualified geologist or engineer. Field observations to be recorded include visual soil classification; color; moisture, the presence of foreign materials such as debris, gels, grease, or granules; sample recovery; and any difficulties with sampling. Sample collection and handling methods will be selected, after considering the following:

- Sufficient sample volume for analytical procedures including QA.
- Prevention of cross-contamination vertically within each boring and from boring to boring.
- Prevention of loss of volatile compounds during sample collection and storage prior to analysis.
- Proper selection of containers and preservation techniques.

Drilling with a hollow-stem auger, sample collection with split-tube drive samplers lined with brass tubes sealed with no headspace and immediately chilled to 4°C, and use of a field steam cleaner to clean tubes, samplers and augers would satisfy these concerns.

On-Site Soil Sampling - Part 1. One boring will be made in the center of each on-site quadrant B or partial quadrant B, with samples designated for analysis at stratum changes and at the following six depths for analysis: ground surface, 2 ft, 4 ft, 6 ft, 8 ft, and 10 ft.

Where distinct layers of different colors or textures are present, separate samples will be taken and analyzed. For instance, where a brown sandy clay contains yellow and white streaks, three separate samples should be analyzed: one of the brown sandy clay, one of the white material alone, and one of the yellow material alone.

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In addition, a boring will be made in the center of any on-site pond or lagoon identified in plant records or in the aerial photograph review (Task 3). Samples will be collected and analyzed at 2-foot intervals to a depth of 10 feet below the original pond bottom or to a depth of 20 feet below the present ground surface, whichever is greater.

Because of DDT's low solubility, most of the DDT transported via surface water would be in the solid (rather than liquid) phase, either as particulate DDT or sorbed onto soil particles. No site-specific data is available on the solid-liquid phase partitioning of DDT in stormwater runoff or on the relationship between grain-size and DDT concentration or the presence of other chemicals that may affect DDT's mobility. It is necessary to determine this relationship to predict the potential off-site movement of DDT via surface water and possible aerial redistribution of dry soils or sediments.

All Part 1 soil samples will be analyzed for all priority pollutants, according to standard EPA protocols. In addition, to predict migration characteristics of the chemicals found (via sediment in surface water or aerial transport), it is necessary to determine the chemical concentrations associated with each particle size. To this end, four samples of each soil type encountered will have complete grain-size determinations made, with separate chemical analyses of several different size fractions of each of these samples, in accordance with procedures to be included in the QAPP and Sampling Plans. The size fractions chosen will be the same as those analyzed under Task 13.

Within 30 days after completion of the Part 1 analyses, a complete report will be prepared for review by EPA. The report will contain results of chemical and grain-size analyses; boring logs and significant field observations; a site map showing all

measured DDT concentrations; one or more site maps showing concentrations of other priority pollutants that exceed state or federal hazardous waste criteria; and proposed Part 2 sample depths and chemical parameters (List of Target Chemicals). Upon EPA acceptance of these results, the Sampling Plan for Part 2 will be finalized, specifying number and depths of soil samples and analyses to be performed (this effort is included in Task 4).

Aggregate and Debris Pile Sampling. Several piles of debris and crushed concrete exist on the site. Volumes of each pile will be measured and samples analyzed for all priority pollutants according to the Part 1 soil protocols. This work may be done concurrently with Part 1 soil sampling. A minimum of 18 samples or one sample per 200 cubic yards of above grade material (whichever is larger) will be analyzed, distributed as follows:

<u>Min. number samples</u>	<u>Depth</u>	<u>Pile type</u>
3	0-1 inch	Crushed concrete
3	3 feet	Crushed concrete
3	5 feet	Crushed concrete
3	0-1 inch	Soil debris
3	3 feet	Soil debris
3	5 feet	Soil debris

Grain-size analyses will be performed on a total of three crushed concrete samples, one from each depth. Separate chemical analyses for priority pollutants will be performed on each size fraction of these three samples.

Part 2 On-Site Soil Sampling. One boring will be made in the center of each quadrant A, C, and D, with samples collected at the following depths for analysis: ground surface, 1 ft, 2 ft, 3 ft, 4 ft, and 5 ft. These depths may be adjusted, with EPA concurrence, based on information obtained in Part 1. Soil samples will be analyzed for the List of Target Chemicals developed based on Part 1 results.

Task 14 - Off-Site Soil, Sediment and Surface Water Sampling [60 days]

After the Part 1 on-site soil and hydrogeologic investigations have been completed and the List of Target Chemicals has been determined by EPA, Sampling Plans for evaluation of off-site migration of those chemicals will be produced and implemented, according to the criteria established below. Separate programs will be undertaken to sample off-site soils, sediment in sewers and storm drains, and surface water. The off-site soil sampling can be done in conjunction with the Part 2 on-site soil sampling; the sediment and surface water sampling can be done at any time after completion of Tasks 1-10 and the List of Target Chemicals. Table 4 summarizes sampling requirements for this task.

Off-Site Soil Sampling. Off-site sampling by EPA and Montrose Chemical Co. in 1982 and 1983 has shown DDT concentrations in soils as high as 2,400 ppm in drainage paths where stormwater runoff leaves the Montrose Facility Site. Further definition of the nature and extent of contamination in this area will be necessary to assess technical feasibility, public health and environmental risks, and costs of the alternative remedial actions.

Table 4. TASK 14 - OFFSITE SOIL, SEDIMENT, AND  
SURFACE WATER SAMPLING REQUIREMENTS

<u>Offsite soil</u>					
<u>Sample type</u>	<u>Sampling interval</u>		<u>Maximum depth, ft</u>	<u>No. of samples</u>	<u>Analyses</u>
	<u>Vertical</u>	<u>Horizontal</u>			
Soil-drainage areas	1 ft	100 ft sq	5 ft <sup>a</sup>	612 <sup>a</sup>	Target chemicals
Soil-site perimeter	1 ft	200 ft lin	5 ft <sup>a</sup>	96 <sup>a</sup>	Target chemicals

<u>Offsite sediments</u>			
<u>Sample type</u>	<u>Sample location</u>	<u>No. of samples</u>	<u>Analyses</u>
Stormwater sediments	Manholes (Montrose to end of Torrance Lateral)	<u>b</u>	Target chemicals
Stormwater sediments	Manholes (Montrose to end of Torrance Lateral)	4	Grain size plus target chemical <sup>c</sup>
Sewer sediments	Manholes (Montrose to treatment plant)	<u>b</u>	Target chemicals
Sewer sediments	Manholes (Montrose to treatment plant)	4	Grain size plus target chemical <sup>c</sup>

<u>Surface water</u>			
<u>No. storm events</u>	<u>Storm size, in.</u>	<u>No. sample locations</u>	<u>Analyses</u>
5 consecutive	>0.20	10	Target chemicals on filtered and unfiltered samples
1 <sup>d</sup>	>0.75	10	Target chemicals on filtered and unfiltered samples

- a. May be adjusted for some locations based on Task 13 Part 1 results.  
b. To be determined based on Task 2 and 3 results.  
c. Separate target chemical analyses on each size fraction.  
d. Can be one of the five consecutive 0.20-in. storms.

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An Off-Site Sampling Plan will be produced for EPA approval based on results of the Part 1 On-Site Soil Sampling, and the list of Target Chemicals. Based on historical air photos and hydrologic data, and existing topography, all drainage areas receiving runoff from the Montrose property will be identified. The offsite soil sampling will include those drainage areas on a 100-ft grid, and a single line of perimeter samples spaced 200-ft apart. Sufficient samples must be taken outside the identified drainage area and to sufficient depth to define the extent of contamination resulting from surface water runoff and infiltration. Sample locations shown in Figure 6 may be adjusted, with EPA approval, in accordance with the above criteria.

One soil boring will be made at each sample location. Soil samples will be collected continuously according to procedures specified in Task 13 and the OAPP and Sampling Plans. Soil samples will be designated for analyses at 1-foot depth intervals to a depth specified in the Off-Site Sampling Plan. Sample collection, handling, preservation, and analytical procedures will follow standard EPA and/or State protocols for the target chemicals.

Surface Water and Sediment Sampling. DDT has been measured in sediments immediately offsite, in sanitary sewers, and in the Dominguez Channel and L.A. Harbor. The objective of the surface water and sediment sampling program in Task 14 is to define the quantity and location of contaminated off-site sediment that originated only from the Montrose Facility Site, and determine flow and sediment transport characteristics for use in technical feasibility and environmental and public health assessments.

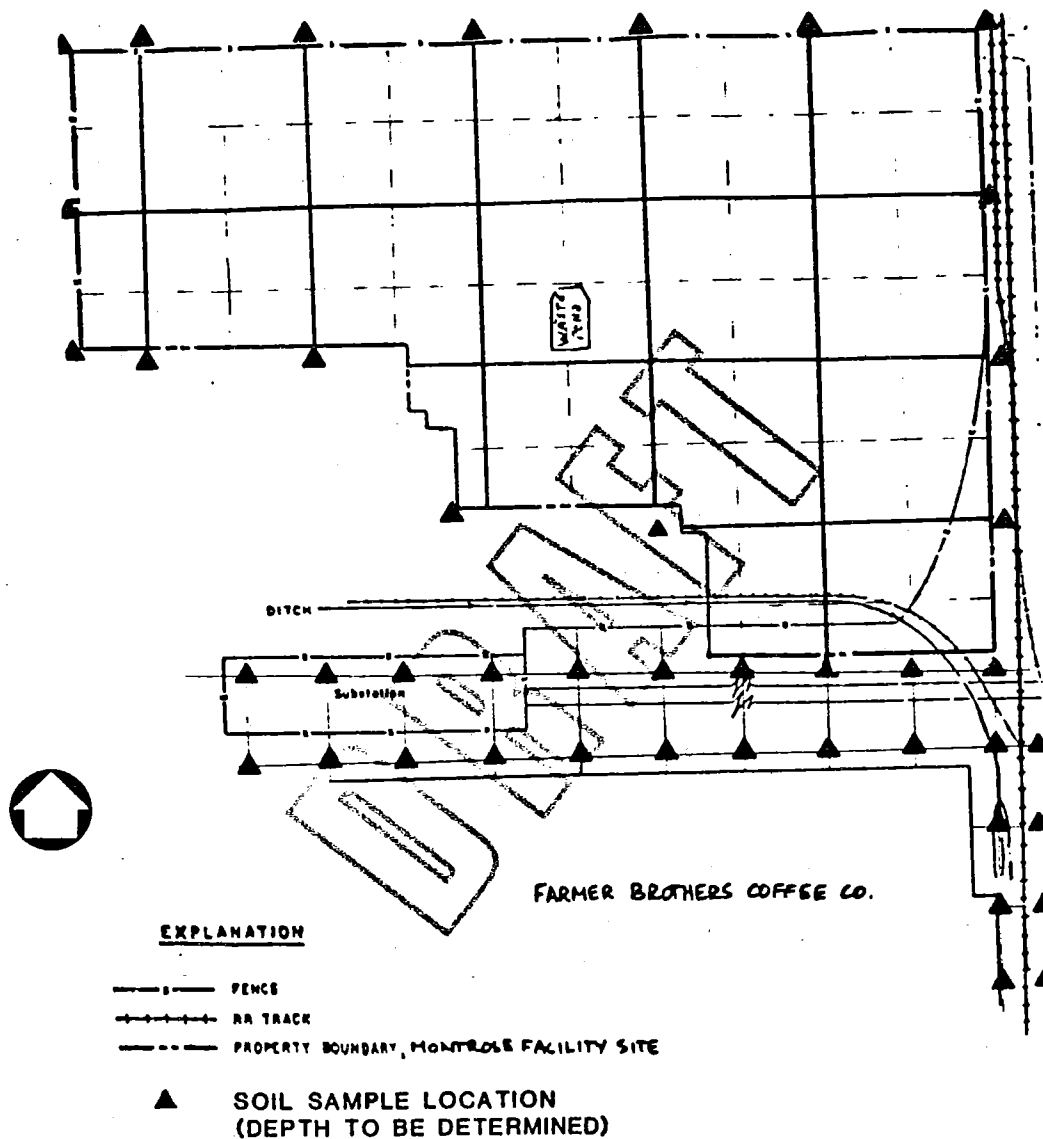


FIGURE 6. OFF-SITE SOIL SAMPLE LOCATIONS  
MONTROSE FACILITY SITE

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Data gathered in Tasks 2 and 3, historical aerial photographs and topographic maps, and topographic maps developed in Task 10 will be reviewed to define flow paths for stormwater from the Montrose Facility Site. Drainage areas that contribute flows that intersect the Montrose flow path(s) will also be identified. This is necessary to interpret sampling data and distinguish between background chemical concentrations and any contribution from the Montrose Facility site. Similarly, sanitary sewer flowpaths from the former Montrose facilities to the water pollution control facility will be identified, including major intersections. When this review has been completed and the target chemical list (Task 13) has been finalized, the Off-Site Sampling Plan will be prepared in accordance with the following.

Stormwater sediment samples will be collected from all manholes, catchbasins, and open storm channels along the flow path from the Montrose Facility Site to the Dominguez Channel. Background stormwater sediment samples will also be collected from one manhole or catchbasin on each flowpath that intersects the Montrose flowpath upstream of the Dominguez Channel. Sediment depth will be recorded at each location.

Sanitary sewer sediment samples will be collected from all manholes along the flowpath from Montrose to the treatment plant. Background sanitary sewer sediment samples will be collected from one manhole on each sewer that intersects the Montrose flowpath. Depth of sediment in the sewer pipeline will be recorded at each sample location.

All sediment samples will be analyzed for the target chemicals established in Task 13, and complete grain-size analyses will be performed. At least four of the stormwater sediment samples and four sewer sediment samples will also have target chemical analyses done on several separate size fractions, to be specified in advance in the Off-Site Sampling Plan based on hydrologic data already developed.

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Surface water samples will be collected at or near the locations shown on Figure 7 for five consecutive eligible storms. Eligible storms must have a total rainfall exceeding 0.20 inch. Six consecutive hours with less than 0.01 inch of rainfall shall mark the end of a storm. Surface water samples at these locations must also be collected for one storm exceeding 0.75 inch (this may be one of the five consecutive storms). At the time of sampling, flowrate will be determined for each sample location.

Surface water samples will be analyzed for the target chemicals. Separate analyses for the target chemicals will be made for suspended solids (if present in sufficient quantity) and filtered water samples. Protocols to determine separate liquid and solid phase chemical concentrations will be included in the Offsite Sampling Plan.

#### Task 15 - Air Sampling

To date there has been no air monitoring in conjunction with any investigation of the Montrose Facility site. The Southern California Coastal Water Research Project reports data on the flux of DDT in an aerial fallout study in 1973-1974\*, however, no ambient air concentration data have been reported for this local area.

The objective of this task is to characterize the ambient air DDT contamination associated with the Montrose Facility site to contribute to preparation of an endangerment assessment (portion of the FS).

\*Young, David R. and D.J. McDermott. "Aerial Fallout of DDT." Coastal Water Research Project, Annual Report for the Year. As presented in EPA Region 9, Toxics and Waste Management Division Investigation Report. April 11, 1983.

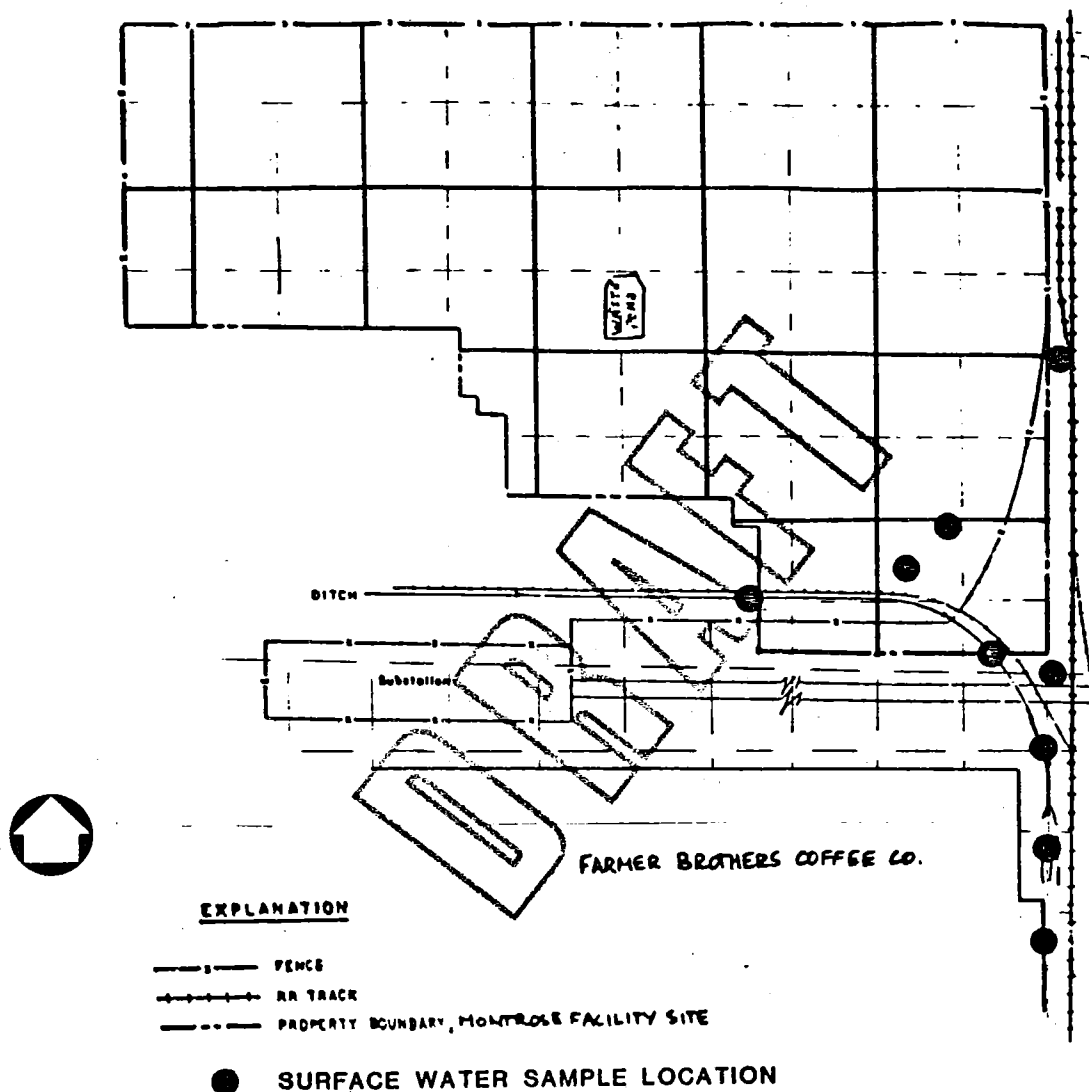


FIGURE 7. SURFACE WATER SAMPLE LOCATIONS  
MONTROSE FACILITY SITE

The basic approach will be an upwind-downwind monitoring network. Appropriate sampling trains will be sited at preselected locations for three runs of a 2-week period. Minimum sampling requirements for this task are shown in Table 5. Activities necessary to implement Task 15 and are discussed in greater detail below.

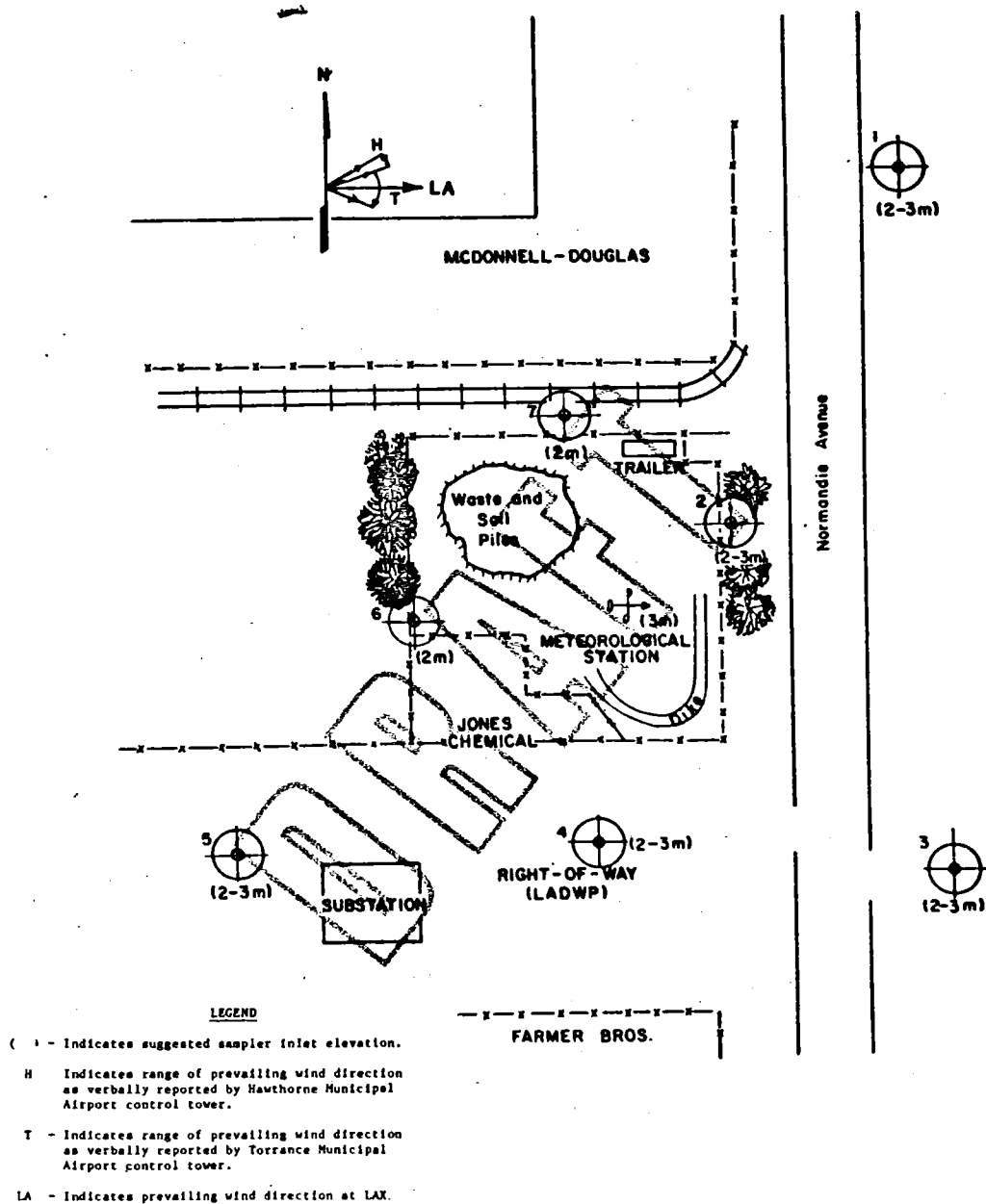
Table 5. TASK 15 - MINIMUM AMBIENT  
AIR SAMPLING REQUIREMENTS

No. sample locations	Sample type	No. samples	Analyses required
7	Hi-volume	3 runs in 2 wk	DDT and Target Chemicals
7	To be determined	3 runs in 2 wk	Target Chemicals

Preparation for ambient air monitoring refers to the normal preparation activities including calibration of sampling equipment, setup of samplers at the designated monitoring locations, and coordination with the analytical laboratory. The specific requirements for this site also include a review of site data collected under Tasks 2 and 3 to confirm sampling and analytical parameters and the involvement of a meteorologist to coordinate the selection of representative sampling days. Briefly, the preparatory tasks include, but are not limited to the following:

1. Review neighborhood industrial processes to identify nearby processes or emissions that may influence the Montrose air monitoring.
2. Review List of Target Chemicals developed under Task 13 and, where appropriate, add parameters to the air sampling and analytical scope.

3. Evaluate site meteorology. Review of existing meteorological data is important in selection of monitoring locations. Monitoring Networks A and B will both accommodate some degree of variability; however, selection of sampling periods during average wind conditions will impact both networks in their most favorable direction. A licensed meteorologist will be consulted to assist in the prediction of such "average" days. The meteorologist will develop acceptability ranges for the predicted meteorological data that is available 1 day prior to sampling.
4. Complete Air Sampling Plan and submit for EPA approval.
5. Calibrate all sampling equipment prior to any onsite monitoring. Depending on the total list of selected parameters of interest, the calibrations will include at least hi-volume air samplers, field barometers, ambient thermometers, and possibly other sampling pumps or rotameters for any sampling trains in addition to the high volume particulate samplers for DDT.
6. Prepare monitoring locations for sampling. Seven microscale locations arranged in an upwind-downwind network are recommended. Figure 8 illustrates one possible network A, which uses several offsite locations requiring the cooperation of neighboring property-owner McDonnell-Douglas Corporation (MD), and a rooftop location (No. 1) on a yet unselected building roof along the east side of Normandie Avenue within 100 m of the northern site boundary. In the event that offsite locations are not feasible, Figure 9 illustrates Network B which uses locations onsite, along the Los Angeles Department of Water & Power (LADWP) right-of-way, and along the east side of Normandie Avenue within 100 m of the northern site boundary.



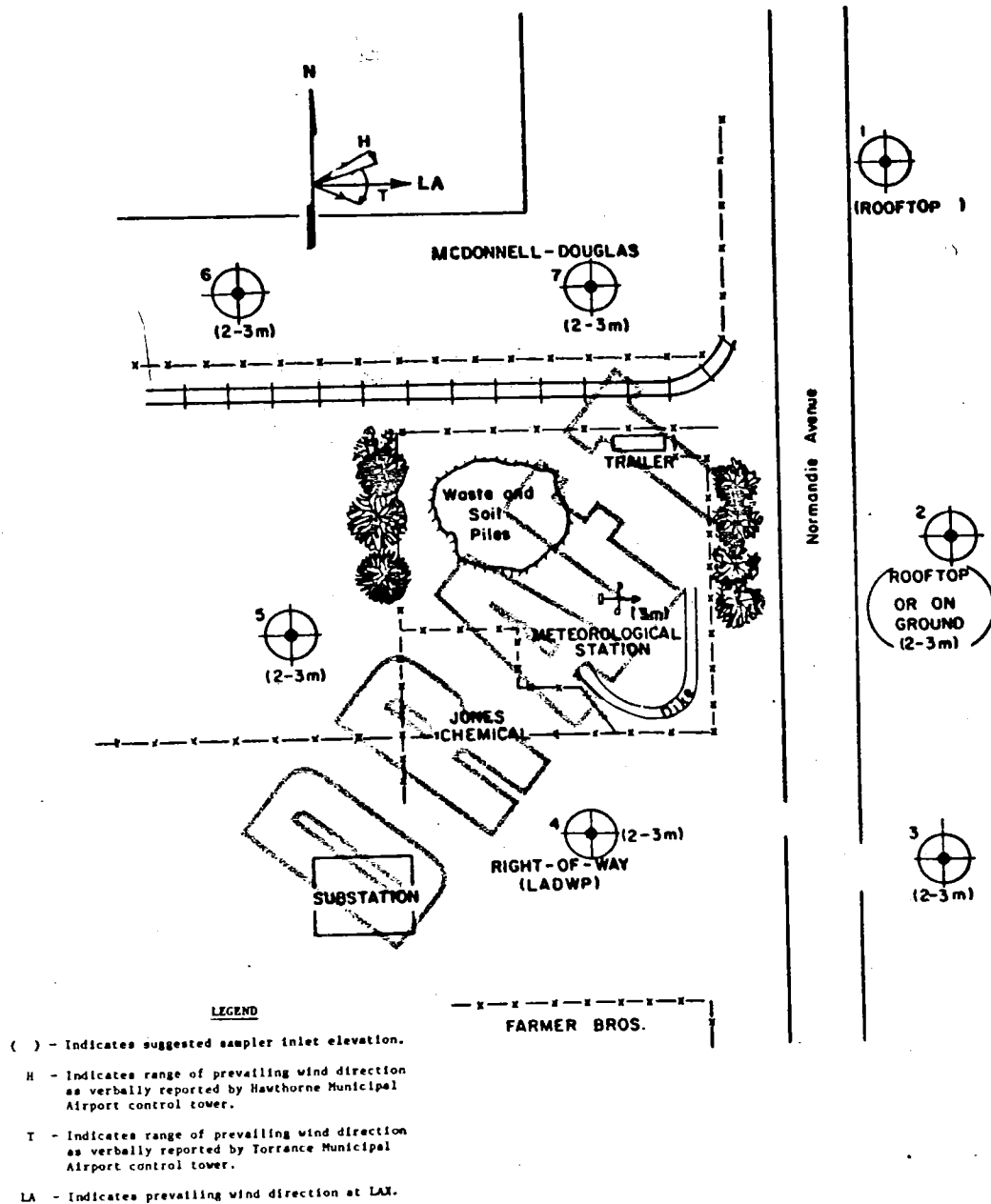


FIGURE 9. SCHEMATIC OF AIR MONITORING NETWORK B  
MONTROSE FACILITY SITE

Of these two networks, Monitoring Network A is the preferred orientation of sampling locations with at least three downwind locations for winds from 180 to 360. Local meteorology indicates an 80% predominance of 240 to 290 degree local winds. Without locations on MD property, Network B is weak in the downwind coverage of some wind conditions. The monitoring network chosen should consider local obstructions, prevailing wind conditions, and access to private property other than Montrose in their configuration. Sampling location changes or different inlet elevations that appear equivalent in the ability to represent the ambient air flow across the Montrose site will be acceptable.

Sampling period will be designated by the meteorologist on the day prior to sampling upon review of weather predictions and monitoring network final design. This will allow the field team to prepare for each of the three runs a day ahead of sampling. On the sampling day, collection media will be loaded into the samplers or connected to the appropriate sampling train. Recommended sampling parameters for several analytical compound groupings are provided in Table 6. This table is not meant to be comprehensive; however, the ability to identify many compounds with these screening methods is a definite advantage. Monitoring will include DDT (pesticide) analysis of samples as collected by a modified hi-volume air sampler (No. 3 in Table 6), and other analyses as determined by EPA based on the Target Chemical List.

Table 6. COMPARISON OF AMBIENT AIR SAMPLING METHODS

Collection media	Analytical parameters	Method references S, A	Flow rate (Lpm)	Duration of run	Type of sampler
1. Particulate filter (0.8µ pore size, glass fiber filter)	TSP <sup>a</sup> Trace metals <sup>b</sup>	1, 1 1, 2	500-1,000	24 hrs.	Hi-volume air sampler
2. Particulate filter (0.3µ pore size, glass fiber filter) with back-up PUF <sup>c</sup> sorbent cartridge	Pesticides Herbicides PNA <sup>d</sup> PCBs <sup>e</sup> Trace metals <sup>b</sup>	3, 4 3, 4 3, 4 3, 4 3, 2	500-1,000	6-12 hrs.	Modified hi-volume air sampler
3. Tenax sorbent cartridge	VOCs <sup>f</sup> Solvents Halogenated hydrocarbons	4, 5 4, 5 4, 5	0.035-0.100	6-12 hrs.	Portable personnel sampling pump with tripod
4. Membrane filter cassette (0.8µ pore size)	Trace metals <sup>b</sup>	6, 2	1.8	6-12 hrs.	Portable personnel sampling pump with tripod
5. PUF <sup>c</sup> sorbent cartridge with glass wool filter	Pesticides Herbicides PNA <sup>d</sup> PCBs <sup>e</sup>	4, 4 4, 4 4, 4 4, 4	3-4	6-12 hrs.	Portable personnel sampling pump with tripod

<sup>a</sup>Total suspended particulate.

<sup>b</sup>Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, Se, Si, Ag, Na, Sr, Ti, Sn, Tl, V, Zn (includes Hg).

<sup>c</sup>Polyurethane foam.

<sup>d</sup>Polynuclear aromatic hydrocarbons.

<sup>e</sup>Polychlorinated biphenyls.

<sup>f</sup>Volatile organic compounds.

#### REFERENCES

1. EPA Regulations on National Primary and Secondary Ambient Air Quality Standards, 40 CFR 50, Appendix B, December 6, 1982.
2. NIOSH Manual of Analytical Methods, Vol. 7, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Cincinnati, Ohio, August 1981, Method P & CAM 351.
3. A Method for the Sampling and Analysis of Polychlorinated Biphenyls (PCBs) in Ambient Air, EPA-600/4-78-048, August 1978.
4. "Guidelines for Air Monitoring at Hazardous Waste Sites for Volatile and Semivolatile Organic Compounds using Tenax and Polyurethane Foam Sorbents," GCA/Technology Division, EPA Contract No. 68-02-3168, Work Assignment No. 26, April 1983.
5. Protocol for the Collection and Analysis of Volatile POHCs Using VOST, EPA-600/8-84-007, March 1984.
6. NIOSH Manual of Analytical Methods, Vol. 1, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Cincinnati, Ohio, April 1977, Method 173.

The sampling run durations specified in Table 5 are general guidelines designed to collect sufficient samples at the suggested flowrate ranges for maintaining sufficiently low detection limits. Also, the periods are long enough to allow sampling during a full diurnal cycle when winds are expected to be at their strongest during an "average" day.

Due to local automobile traffic and the industrial nature of the surrounding area (refineries, chemical manufacturers), significant background levels of organic contaminants can be expected. Also, the urban levels of criteria pollutants such as SO<sub>2</sub>, NO<sub>x</sub>, CO, or O<sub>3</sub> which may interfere with some sampling methods could prove to be problematic.

Figures 8 and 9 both indicate a meteorological monitoring station almost centrally located on the site. This station will monitor and record wind speed, wind direction, and ambient temperature for the 2-week monitoring period to assist in data evaluation and the sampling day selection process.

#### Task 16 - Evaluation of Data

Upon completion of all necessary parts of the remedial investigation, all data, with particular emphasis on the subsurface investigation data, air monitoring data, sediment data and other analytical results, will be evaluated to prepare a complete site assessment. The assessment will delineate the type, extent, source and pathways of surface water, groundwater, soil and sediment contamination on-site and off-site with particular emphasis on DDT.

#### Task 17 - Preparation of Remedial Investigation Report

After completion of the remedial investigation, all pertinent field and laboratory data will be assembled into a detailed draft report. The report will include detailed descriptions of the following items:

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data base  
transport and fate model

- Objectives of the remedial investigation.
- A site description, including the environmental setting of the site.
- A Site Base Map including location of on-site soil/debris piles, groundwater monitoring wells and air, soil and sediment sampling locations on-site and within 500 feet of all site boundaries.
- Hydrogeologic conditions at the site with emphasis on the aquifers and possible directions of groundwater flow.
- An area map, adapted from USGS topographic maps, which will show any other off-site sampling locations not depicted on the Site Base Map.
- Extent of groundwater contamination.
- Extent of surface water contamination, if possible.
- Extent of soil and/or sediment contamination.
- Extent of fugitive emissions contamination.
- Identification of potential sources of contamination and pathways for this contamination.
- Supporting data, such as soil testing data, well and soil boring logs, chemical analysis reports, and monitoring well water level elevations.
- Conclusions and recommendations.

Task 18 - Remedial Investigation Oversight

This task will be performed by a contractor to EPA and covers oversight of all remedial investigation activities performed by other contractors. Specific items will include technical assistance in reviewing the Health and Safety Plan, the Quality Assurance Project Plan and Sampling Plans, preliminary and draft technical reports, and oversight of field activities.

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SECTION 3  
FEASIBILITY STUDY  
WORK PLAN

Section 3  
PHASE II - FEASIBILITY STUDY WORK PLAN

The purpose of the feasibility study is to identify and evaluate appropriate remedial measures, select the most cost effective remedial alternative and prepare a conceptual design of the selected alternative. The feasibility study will be based on existing site information and information obtained during the remedial investigation.

Task 19 - Preparation of Feasibility Study Work Plan (10 days)

A work plan for the Montrose Facility Site Feasibility Study will be prepared. The work plan will present a detailed schedule and budget for the activities to be undertaken. The major tasks of the feasibility study are as follows:

- Development of remedial response objectives and criteria.
- Identification of remedial alternatives.
- Endangerment Assessment.
- Initial screening of remedial alternatives.
- Performance of treatability studies (if applicable).
- Detailed evaluation of remedial alternatives.
- Preparation of preliminary feasibility study report.
- Development of post-closure, long-term monitoring plan.
- Preparation of final feasibility study report.

- Community relations.
- Conceptual design of selected alternative.

Task 20 - Development of Objectives and Criteria for Remedial Action (5 days)

According to the NCP, the objective of remedial action is to permanently prevent or mitigate the migration of hazardous substances into the environment, and the effects of such action. The selection of site specific objectives will consider:

- The extent to which substances pose a danger to public health, welfare, or the environment, including:

Population at risk

Amount and form of substances present

Hazardous properties of the substances

Hydrogeological factors

Climate

- The extent to which substances have migrated or are contained by natural or man-made barriers
- The experiences and approaches used in similar situations by state and federal agencies and private parties
- Environmental effects and wildlife concerns

Specific objectives that must be met to mitigate the identified problems at the Montrose Facility site will be developed under this task.

Criteria for evaluation of remedial alternatives must provide a standard of judgment for testing the suitability of each remedial measure. Standard criteria for evaluation will include the following:

- Technical Feasibility-Implementability/Reliability
- Mitigating and Adverse Effects on Public Health, Welfare and the Environment
- Capital and Long-Term Operating/Monitoring Costs

Task 21 - Identification of Remedial Alternatives (5 days)

Appropriate remedial technologies will be identified for the site objectives determined in Task 21. These technologies will be evaluated singly and in combinations to determine how well they meet the established remedial action criteria. One or more appropriate remedial technologies will be grouped together as required to constitute the remedial measure.

The identification process for remedial technologies will take into account the type of media contamination, the site specific conditions (soils, geology., etc.), public health and safety concerns, and the existing EPA and California DOHS Hazardous Waste and related regulations.

The results of the RI will be used to develop a list of candidate remedial alternatives. In general, these alternatives would include on-site and off-site source control (capping, encapsulation, etc.) and on-site and off-site source removal (excavation with secure final disposal) remedial alternatives.

Task 22. Endangerment Assessment (20 days)

An Endangerment Assessment will be performed for the No-Action remedial alternative. The objective of an Endangerment Assessment is the determination of the magnitude and probability of harm (exposure and risk) presently or potentially caused to humans, animal or other environmental receptors. The Endangerment Assessment would identify and evaluate site-specific data, qualitatively and quantitatively predict expected hazards or describe actual hazards, provide conclusions regarding potential risks ("endangerment") incurred by the public or the environment, and adequately and reliably document all relevant facts in support of the conclusions. Under CERCLA and the NCP, appropriate remedial response cannot be determined unless the degree of probability of risk is determined first.

Task 23. Initial Screening of Alternatives (10 days)

An initial screening of the remedial alternatives identified in Task 23 would be conducted in order to eliminate from further detailed evaluation those alternatives that are clearly not feasible or appropriate. Four major cost effectiveness criteria will be used in the initial screening:

Technical Criteria. These relate to the implementability and reliability of the alternative. Alternatives which are difficult to implement, which will not achieve the remedial alternatives in a reasonable time period, or which rely on unproven technology will be eliminated from further consideration. Past performance of remedial measures under similar conditions will be considered where appropriate.

Environmental/Public Health Criteria. Alternatives which pose the threat of significant adverse environmental effects, or danger to workers or the general public during implementation, will be eliminated.

Institutional Criteria. Alternatives which are not implementable due to federal/state legislation and/or community acceptance etc. will be eliminated.

Cost Criteria. Alternatives whose total cost (capital and O&M) and post-closure, long term monitoring costs far exceeds those of other alternatives without significant added benefit will be eliminated.

Task 24. Performance of Treatability Studies (5 days)

As a result of the development and screening of alternatives, the need may be identified for laboratory studies to evaluate the effectiveness of a remedial technology for site specific conditions and to establish design criteria. If this need is identified, the chosen contractor would review the requirement with EPA and the State and prepare a work plan for the recommended laboratory studies for their approval.

Task 25. Detailed Evaluation of Alternatives (30 days)

The alternatives which remain after the initial screening would be subjected to a detailed evaluation to select the most desirable alternative for recommendation for EPA and the State.

Detailed Development of Remaining Alternatives. To provide the basis for a realistic comparative evaluation of the remaining alternatives, the alternatives will be developed in sufficient detail to provide information necessary for analysis of public health, environmental and institutional issues, technical factors and cost. As a minimum, the following should be included:

1. Description of appropriate treatment and disposal technologies.

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2. Special engineering considerations required to implement the alternative (e.g., pilot testing).
  3. Environmental impacts, and proposed methods and costs of mitigating any adverse effects.
  4. Operation, maintenance and monitoring requirements.
  5. Off-site disposal needs and transportation plans.
  6. Temporary storage requirements.
  7. Safety requirements for implementation.
  8. A description of phasing opportunities to reduce environmental impact and/or cost.
  9. A description of how the alternative could be segmented into areas to allow implementation in phases.
  10. A review of available off-site facilities to ensure compliance with RCRA.

Public Health and Environmental Assessment. An assessment of public health and environmental impacts of all practical remedial alternatives should be performed by experienced environmental specialists in the fields of biology, hydrogeology, environmental engineering, and public health. If requested by the U.S. EPA, a detailed assessment of each alternative would address at a minimum the risks posed by the No-Action alternative versus the impacts to be incurred during implementation of each alternative. Differences between short- and long-term public health and environmental impacts of identified remedial actions should also be described. A detailed analysis should be performed if it is expected that a remedial alternative will result in any of the following:

1. A new substantial increase in airborne emissions;
2. An increase in the volume of loading of a pollutant from existing sources or new facility to receiving waters, storm drains etc.;

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3. Known or expected significant adverse effects on environmental media or human use of environmental resources; and
  4. Known or expected direct or indirect adverse effects on environmentally sensitive resources or areas, such as wetlands, aquifer recharge zones, or areas containing endangered or threatened species.

Each detailed environmental analysis should consist of the following:

1. Identifying effects of each remedial alternative on the release of the contaminants;
2. Estimating reduction (from current condition) of contaminants in the environment;
3. Predicting improvement in the biotic environment from the current scenario;
4. Predicting improvement in human resource use;
5. Predicting the adverse effect of each alternative, if any; and
6. Proposing methods of mitigating predicted adverse effects of each alternative.

The detailed environmental analysis of each remedial alternative should be based on the following criteria:

1. Comparison with existing ambient concentrations standards and criteria.
2. Effect on sensitive environments.
3. Effect on human resource use pattern (fishing, traffic disruption, reduction in property values, loss of employment, etc.).
4. Timeframe of the effects of the remedial response.
5. Environmental effects which might result from failure of the remedial alternative.

The public health assessment of each remedial alternative should consider the expected health risks of the surrounding population during implementation and following completion of each alternative.

Technical Evaluation. A detailed evaluation of the technical feasibility of each remedial alternative under consideration should also be performed. Although technical feasibility was considered in general during the initial screening of alternatives, a detailed evaluation would determine the relative degree of feasibility of each alternative in relation to the other alternatives under consideration. The detailed analysis of technical feasibility would also provide data for use in a subsequent cost-effectiveness analysis of all remedial alternatives.

Criteria that should be used to evaluate the technical feasibility of each alternative include:

1. Reliability
2. Implementability
3. Safety Considerations.

Cost Evaluation. The evaluation of costs for each alternative should be conducted in conformance with evaluation procedures as specified under CERCLA. This cost evaluation of remedial alternatives would consist of the following three steps:

1. Estimates of Costs. Determine capital, annual operating and post closure, long-term monitoring costs for remedial alternatives.
2. Cost Analysis. Using estimated costs, calculate stream of payments and present worth for each remedial alternative.

3. Sensitivity Analysis. Evaluate risks and uncertainties in cost estimates.

Cost-Effectiveness Methodology for Analysis of Alternatives. The objective of the cost-effectiveness analysis is contained within the National Contingency Plan which states: "The appropriate extent of remedy shall be determined by the lead agency's selection of the remedial alternative which the agency determines is cost-effective (i.e., the lowest cost alternative that is technologically feasible and reliable and which effectively mitigates and minimizes damage to and provides adequate protection of public health, welfare, or the environment)."

The site-specific criteria which should be applied uniformly to each remedial alternative to evaluate its cost-effectiveness include:

1. Cost
  - . Capital cost
  - . Operations and maintenance (O&M) cost
  - . Annual capital cost
  - . Annual or present worth O&M cost
  - . Total annual cost (sum of annual capital cost and annual O&M cost)
2. Technical
  - . Proven or experimental technology
  - . Risk of failure
  - . Length of time required for cleanup
  - . Feasibility/Implementability/Reliability
3. Public Health
  - . Reduction of health and environmental impacts
  - . Level of cleanup/isolation achievable
4. Institutional
  - . Acquisition of necessary federal, state, and local permits
  - . Role of adjacent landowners (e.g., right of entry)
  - . Community impacts

5. Environmental

- . Relevant environmental criteria
- . Impact of failure
- . Length of time required for cleanup
- . Carrying capacity of the environment
- . Ability to minimize adverse impacts during action
- . Ability to minimize off-site impacts resulting from activities on-site.
- . Remoteness of activities (from nearby residences)
- . Usability of surface water and groundwater.

A trade-off matrix should be prepared by the contractor and submitted to EPA for review. This matrix would list along the left-hand side of the table those remedial alternatives under consideration, with corresponding effectiveness criteria and weighting factors across the top of the table. The trade-off matrix would be used to rate the various remedial alternatives based on the chosen criteria. Weighting factors are applied to the individual effectiveness criteria, which are rated for each alternative, and a final score (sum of ratings times weighting factors) is calculated for each alternative. The trade-off matrix is an effective means of presenting the determination and rationale behind the selection of the most cost-effective remedial response.

Task 26. Preparation of Preliminary Feasibility Study Report  
(15 days)

A preliminary feasibility study report should be submitted to the EPA which would incorporate any previous interim reports and detail all work completed in the feasibility study. The preliminary report would present the recommended remedial action alternative and would provide the rationale behind its selection as being environmentally sound and cost-effective.

Task 27. Development of Post Closure, Long-Term Monitoring Plan (5 days)

A detailed post closure, long-term monitoring plan should be completed for the selected, cost-effective remedial alternative. A monitoring period to determine the effectiveness of the implemented alternative would be selected in consultation with the appropriate state and EPA officials. The plan would include a description of all the various tasks which would be accomplished during the monitoring program. The costs associated with the implemented monitoring plan would ultimately depend upon which remedial alternative is finally selected for the site

Task 28. Preparation of Draft Final FS Report and Final FS Report (15 days)

A Draft Final Feasibility Study Report would be prepared and submitted to the U.S. EPA for review and comment. The Draft Final Report would incorporate the conceptual design of the cost-effective remedial alternative selected by the U.S. EPA into the previously submitted Report. Any comments/revisions required by the U.S. EPA would be incorporated into the Draft Final Report. Thereafter, the Final Feasibility Study report would be prepared and submitted to the U.S. EPA.

Appended information should include at least the following:

- Site topographic map with ground control data.
- General arrangement drawing of remedial measure.
- Typical geologic and design cross-sections.
- Typical design details.
- Design report with supporting calculations.
- Erosion and sedimentation control plans, if applicable.
- Construction health and safety plan
- Preliminary cost estimates.

Task 29. Conceptual Design of Selected Remedial Measure (10 days + ?)

A conceptual design of the selected remedial measure should be prepared for use in development of detailed construction plans. The design would be based on the findings of the remedial investigations and the remedial measures evaluation.

The conceptual design would include general arrangement drawings and specifications. The remedial investigation would be a companion document to the conceptual design plan.

The conceptual design plan should include the following:

- The selected engineering approach with implementation schedule.
- Any special implementation requirements.
- Applicable design criteria.
- Preliminary site layouts.
- Budget cost estimates including operation and maintenance cost figures.
- Operation and maintenance requirements.
- Safety Plan including costs.
- Equipment and construction functional specifications.

Any additional information required as the basis for the completion of the final remedial design should also be included.

Task 30. Community Relations Support (ongoing)

Under this task, the contractor will provide assistance to EPA in implementing those tasks developed in the CRP (Task 8 under RI) that occur during the Feasibility Study phase. Tasks are expected to include preparation of fact sheets and other information releases and logistic and technical support at public meetings and during public comment period(s).